



Passing the Baton

Dinko Počanić completed his term as Department Chair in August 2010, and a year later was appointed to succeed Gordon Cates as Director of the Institute of Nuclear and Particle Physics. During his five years as Chair, Dinko skillfully oversaw a major renewal of the Faculty after a wave of retirements created many vacancies. Taking advantage of favorable University finances from 2006 to 2008, the Department recruited nine new tenure-track Faculty. Difficult economic times since 2009 have not stopped the Department's progress, fueled by a rise in external funding. Dinko himself has contributed to this increase by earning a \$2.5M NSF Major Research Instrumentation grant for development of a magneto-electrostatic spectrometer for high precision measurements of neutron beta decay. It is an ambitious project to extract fundamental information on elementary particle properties. Meeting this challenge will be nothing new for Dinko, a man of formidable energy. Born in Sarajevo, he graduated from the University of Zagreb in 1981, served in the Yugoslav Navy, and came as a post-doc to Stanford in 1984 with his wife, Franciska. Shortly after they moved to Virginia in 1987, their daughters, Helena and Antonia, were born. At UVa, Dinko built a flourishing research program in experimental nuclear physics; the recent MRI grant is the latest recognition of the program's reputation and of Dinko's leadership in this field's international community. A daunting challenge came when Dinko had to undergo debilitating therapy for lymphoma while he was Chair. But Dinko is not slowed down by adversity. He is known to bicycle to work through cold rain and simply dry it off, saying, "I am not made of sugar." Actually, that's only true on the physical level, because he is a very kind and gentle person and an unshakable optimist.



Our new Chair is Joseph Poon, who joined our Department as Assistant Professor in Fall 1980, was promoted to Full Professor in 1987, and has been the William Barton Rogers Professor of Physics since 1996. He is a graduate of Cal Tech, where he arrived from his native

Hong Kong on a Cal Tech undergraduate scholarship. He came to UVa after a two-year stint as a research associate at Stanford University. He quickly became a productive researcher and an excellent teacher, earning the All-University Outstanding Teaching Award in 1995. Meanwhile, he rose in his reputation as a scientist in the field of Condensed Matter Physics and Materials Physics and its applications, specializing in the study of quasicrystals and bulk metallic glasses. He became a Fellow of the American Physical Society in 1994. He was chosen by *Scientific American* as one of the 50 Research Leaders for 2004, together with his collaborator Gary Shiflet from Engineering, with the citation "Created amorphous steel that could strengthen skyscrapers and armor-piercing rounds". He has been involved in many other collaborations, managed nearly ten million dollars in grants, obtained 7 patents, published 235 papers which have been cited a total of 7500 times, supervised the Ph.D. theses of Jack Simonson, Slade Culp, Yue Xia, Qian Guo, Fred Pierce, Pavel Volkov, Yi He, Byron Biggs, John Wagner, Yong Shen, and Manus Wong, in addition to working with postdocs and undergraduates in his group. In the middle of all this continuing activity, he goes daily to the gym and finds time for vacations at the beach with his wife, Heidi, and their son, Andreas.

Joe Poon leads by example, expecting others to keep up with him as best they can. His dynamic perspective on the future of the Department is outlined in the "Letter from the Chair" on page 2.

Letter from the Chair

Dear Alumni & Friends,

First I want to greet you in this new issue of our *UVa Physics News* with the good news that the Department has done well despite the recession and significant budget cuts. Our annual research expenditures continue to rise. Thanks to the great effort and resourcefulness of our faculty, this past fiscal year the Department found itself the leader in external research funding among the science departments in the College. You can read about the many notable achievements of our faculty in the "Recent News" column of our Department website: <http://www.phys.virginia.edu/>. Our young faculty have performed well in establishing their research programs. Our undergraduate program continues to thrive, and our graduate program continues to improve. The class of 2011 saw 46 of our physics majors receive their bachelor degrees, placing our undergraduate program in the top two percent of the 503 undergraduate physics programs surveyed by the American Institute of Physics. Many of these graduates are currently pursuing advanced degrees in top-ranked physics graduate programs. As we strive to strengthen our research programs, we are working particularly hard to improve the quality of education and training at the graduate level. It takes little convincing to believe that substantial resources will be needed to support a competitive research and education enterprise like ours. Therefore, we appreciate any form of donation you can make to support the Department's future. We certainly appreciate the contributions you have given to the Deaver Undergraduate Scholarship Fund in the past two years.

Joe Poon

Support the Department

The Deaver Scholarship Fund has reached \$280,000, thanks to gifts from more than 120 of Bascom Deaver's friends and students. We are pleased to report that they rose to the challenge to match the significant gift from William Goodman that was announced in the last Newsletter. In addition to the Deaver fund, general pledges and new initiatives are greatly appreciated. For additional information, please contact:

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Changing of the Guard



Julia Garrett, better known as Suzie, has seen hundreds of graduate students pass through her office; from admission to graduation, she was like a mother to them. But they were not the only ones who benefited from her warmth and humor; the faculty also relied on Suzie for her expert assistance and can-do attitude.

Suzie joined the department in 1980 and retired in December 2010. Since then, she has enjoyed spending time at home in Gordonsville with her husband Donald (who will retire soon) and their cats, as well as visiting with their five grandchildren from son, Scott. She remains in touch with her friends in the Department, joining the staff for holiday breakfast gatherings, and occasionally for Chinese food on Wednesday.

Elizabeth Orser was promoted to Assistant to the Chair when Suzie left. She is originally from Charlottesville and attended Albemarle High School, where she played Varsity Basketball. She majored in Sports Administration at VCU, and began working in Physics as a temp in Fall 2006. Now Beth runs the Department with ease and grace. She is recently engaged and will be married in Spring 2012.

Helen McLaughlin, who hails from the North Shore of Long Island, earned a Master of Fine Arts from Virginia. Since July, she has been the one who answers the phone or meets you cheerfully as you come to the Physics Office. We feel lucky to have her as Physics Education & Outreach Assistant while she continues her writing pursuits in her free time.



Beth Orser and Helen McLaughlin

Please send address changes, comments, and suggestions about the newsletter to
physicsnewsletter@virginia.edu

Honors and Awards

Undergraduate Students

The Deaver Scholarship was awarded to **Sherwood Andrew Richers III** for 2010, and to **Christopher Olund** for 2011.

The Mitchell Scholars for 2011 were **Frank Barrows**, **Brian Ichter**, **Sherwood Andrew Richers III**, and **Anshuman Pal**.

The Most Outstanding Physics Major Award went to **Michael Devin Delos**, **William Monroe Jacobs**, and **Jason Harold Shore** in 2010, and to **Ruffin Eley Evans** and **Jiraphat Tiamsuphat** in 2011.

Ruffin Eley Evans won the 2011 Stephen T. Thornton Outstanding Undergraduate Physics Research Award, for his work, "On the experimental violation of Mermin's inequality with imperfect measurements", supervised by Olivier Pfister. The American Physical Society has chosen Ruffin as a national Finalist for the 2011 LeRoy Apker Award for outstanding research by an undergraduate.

Kaitlyn Bixel was the 2011 Young Scholar.

Graduate Students

The Teaching Resources Center Outstanding Teaching Award in Physics was given to **Joey David Goodell** in 2010 and to **Ryan Duve** in 2011.

In the Spring 2011 Graduate Poster Competition, First Place was awarded to **Chaolun Wu** for "Real-Time Finite-Temperature Holography and its Applications", supervised by Diana Vaman, Second Place to **Rupesh Silwal**, Third Place to **Kelsie Betsch**, and Fourth Place to **Jirakan Nunkaew**. All the posters are online at www.phys.virginia.edu/Research/GraduatePosters/Spring2011.

The Spring 2011 UVa Award for Excellence in Scholarship in the Sciences and Engineering was given to **Kelsie Betsch** and **Jirakan Nunkaew**.

Rachel Yohay was selected as 2011-2012 Achievement Rewards for College Scientists Scholar.

Faculty

Lou Bloomfield received the 2009 Jefferson Scholars Faculty Prize.

Thomas Gallagher received a 2010-11 Distinguished Scientist Award from the University of Virginia.

New Faculty Spotlight

Robert Craig Group

Craig Group works at the frontier of discovery in High Energy Particle Physics. He has a joint appointment as Assistant Professor at UVa and at Fermilab near Chicago, where he



was a Research Associate for four years after obtaining his Ph.D. at the University of Florida. Craig grew up in South Carolina, so moving to Virginia in August 2010 was a bit of a homecoming. He has settled here with his wife Nicole, a biologist, and their two young sons.

An active member of the team that ran the CDF (Collider Detector at Fermilab) on the Tevatron, Craig has been chosen successively as the convener of several groups involved in CDF data analysis.

First, he led the group that detected the single-top-quark production. The top quark, t , is usually produced by the strong force along with its antiquark, but also more rarely by the weak force as a single t along with some other antiquark. The CDF group verified that single- t production happens at the rate predicted by the Standard Model (SM). This important milestone in the study of t -quark properties had been a focus of research at Fermilab since the t -quark was discovered there in 1995. It strongly supports the SM assumption that there are no quarks beyond the known six.

Next, Craig moved on to search for evidence of the Higgs boson, using techniques similar to those developed for the single- t . Observing the Higgs (if it exists) is crucial for further advances in particle physics. Although the Tevatron energy may have been insufficient to observe the Higgs with high significance, traces of it could be detected through advanced analysis of the vast CDF dataset. Craig has been chosen as the CDF Higgs Discovery Group convener, to oversee all search efforts, conducted in many final states by several teams. His own team at UVa, which includes Research Associate Yuri Oksuzian and graduate student Hao Liu, is searching the most sensitive low-mass channel.

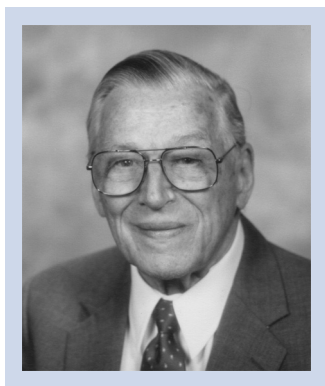
Professor Group has also joined the Mu2e experiment, a search for the conversion of a muon into an electron without the usual creation of a muon neutrino and electron antineutrino pair at the same time. Extremely rare in the SM, this process is required in the "unified" theories that are expected to describe new physics at very high energies. As Craig tells computer-savvy students he is actively recruiting: "These are truly exciting times to be a particle physicist!"

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Royal Society Issues Mitchell's Biography

John W. (Jack) Mitchell, FRS, who was the William Barton Rogers Professor of Physics in our Department, is commemorated in the December 2011 issue of *Biographical Memoirs of Fellows of the Royal Society of London*. Famous for the beautiful observations on which he based his theory of the photographic process, Mitchell was awarded prestigious prizes in England, Germany, Japan, and the US, including a Life Achievement Award in Science from the Commonwealth of Virginia.



Born in 1913 in New Zealand, Jack grew up there, exploring the mountain wilderness to indulge his interests in botany and geology. According to his *Autobiography* (www.phys.virginia.edu/History/Mitchell), "he owed much of his lifelong interest in crystalline solids and the processes of physical and chemical change in the solid state" to his early field work in crystallography. He also attended school, reluctantly at first, but soon with distinction, earning an M.S. in chemistry. In 1935, he left for England to study at Oxford.

As war broke out, Mitchell joined the Armament Research Department, where he developed a microsecond discharge flashlamp for high-speed photography of the impact of armor-piercing shells. He used this "Arditron" to study shock waves in metal plates and the associated plastic deformation. The theoretical interpretation of these results brought Mitchell in contact with Neville Mott, who invited him to the University of Bristol in 1945.

Many seminal advances occurred in the next decade at Bristol, in the understanding of the role played by crystal defects and impurities in processes such as plastic shear and the formation of precipitates. Mitchell pioneered the use of photography to study these microscopic pro-

cesses. In particular, he demonstrated the existence of various types of dislocations that previously were only postulated to exist theoretically. His crowning achievement was the formulation of a theory of photographic imaging, in which he combined his deep knowledge of defects in silver halides with that of photochemistry. This theory won him immediate recognition, including the titles of FRS and Fellow of the APS, but was challenged by proponents of alternative theories, including Mott himself.

Perhaps tired of controversy, Mitchell came to Virginia in 1959 and immersed himself in research on the plastic deformation of single crystals. In his trademark search for fundamental explanations of complex processes, he designed elegant experiments unraveling, for instance, the formation of slip bands by dislocation avalanches. Working with him on this research program, 26 graduate students earned their Ph.D. degrees at UVa.

After retiring in 1979, Mitchell returned to his theory of photography, to revise and perfect it in numerous publications, with the assistance of his second wife, Virginia. He enjoyed his world fame, traveling widely as a lecturer and a consultant (especially to Fuji) as well as a tourist, and pursued his broad cultural interests, which included linguistics, history, literature (in six languages), and foreign affairs. He died in 2007, leaving one million dollars to the University to endow the Mitchell Scholarship Fund. For donations to this Fund, or other initiatives in Mitchell's honor, please see "Support the Department" on page 2.

Jack Mitchell is fondly remembered by all those who benefited from his vast knowledge of pure and applied physics, which he was always willing to share with colleagues and students alike.